Method for routing a service request in a telecommunication system, using E.164 numbers and a DNS.

FIELD OF THE INVENTION

[0001] The present invention relates to a method and an apparatus for routing a service request in a telecommunication system towards a destination user

BACKGROUND

[0002] Users of telecommunication systems use to be assigned to one or more identifiers. Such identifiers are intended to be used by other users for requesting communications, and can take various formats according to the specific telecommunication technology for which they where devised.

For example, E.164 numbers (ITU recommendation E.164, May 1997) (commonly known as "telephone numbers") are usually used as identifiers in legacy telecommunication systems such as: PSTN (Public Switched Telephone Network), ISDN (Integrated Services Digital Network), or 2G (second generation) mobile systems. E.164 numbers where primarily defined for allowing routing telephony calls based on its numeric structure. So, for example, an E.164 number such as "+34 91 555 XXXX" could identify a user in Spain within the local area of Madrid.

[0003] Identifiers used in modern telecommunication systems providing, for example, multimedia services (such as: video conference, data transfer, multimedia messaging, etc., as well as traditional voice-only calls) use to align with URI (Uniform Resource Identifier) format. Usually, these modern systems support also legacy identifiers, such as E.164 numbers, for interworking purposes with legacy

systems, as well as for keeping associated to the same user
an old (legacy) identifier. URIs are well-known identifiers
widely used by Internet application and services for
identifying resources (either: abstract of physical
entities). URIs are further divided as "locators" (Uniform
Resource Locators, URLs) or "names" (Uniform Resource
Names, URNs). As opposed to URNs, that are intended to
merely name a resource (even when the resource itself
ceases or becomes unavailable), URLs identifies a resource
by its location in a network (i.e.: identifies and locates
it). For the sake of a greater simplicity, and given that
the abstract conceptual differences between URIs and URLs
are tiny enough for considering them equivalent when
referring string of characters that "identify" resources,
the term URL shall be used hereinafter.

Nowadays, URLs are assigned as identifiers to a plurality
of heterogeneous resources for which service requests can
be received. For example, an URL can be used to identify a
web page, an electronic mail account, a file downloadable
file, etc.. Identifiers associated to users that are served
for a given service in a specific network domain, use to be
URLs that has a format that comprises: a user-name portion
and a domain-portion, separated by the separator character
"@". The domain-portion identifies the network domain
serving a given user, who is named (and identified) as
specified in the content of the user-name portion in said
domain.

[0004] Telecommunication systems using a multimedia
protocols, such as H.323 protocol (ITU-T recommendation
H.323, November 2000) or SIP protocol (IETF RFC2543
"Session Initiation Protocol", March 1999), use URLs to
identify their users (among other type of identifiers). So,
a user having a subscription with a telecommunications
operator that owns a telecommunication system supporting a
multimedia protocol such as SIP, uses to be assigned to an

identifier having an URL format (known as SIP-URL) that
identifies said user in the network domain of said
operator; for example "sip:*John.Doe@OperatorA.se*".
Similarly, for other communication services, such as
5   traditional telephony, fax, electronic mail, modem based
data calls, etc., a plurality of URLs can be defined to
reach the destination user in the corresponding service
point according to the requested service (e.g.: a plain
telephone, the inbox of a mail account, a fax machine, or a
10   modem); for example: "*tel:+98-7-6543210*",
"mailto:*John.Doe@OperatorA.se*", "*fax:+ 98-7-6543210*",
"*modem:+ 98-7-6543210;type=v110*".

[0005] A given user having a subscription with a
telecommunications operator can, depending on the
15   capabilities of the telecommunication system of said
operator, an also depending on his/her subscription
characteristics, receive a plurality of telecommunication
services, or just only one type of services, having
subscribed other services with another operator.
20   For example, a user can have a subscription with Operator-A
for basic telephony service, multimedia communication
service and electronic mail service. Also, a user can have,
for example, basic telephony and multimedia services
subscribed with Operator-A, while keeping a subscription
25   with Operator-B for solely multimedia service.
An example of a telecommunication system able to provide a
variety of telecommunication services and handle various
kind of identifiers for users (including E.164 identifiers
and URLs) is a 3G (third generation) mobile system having
30   the, so called, IMS (Internet Protocol Multimedia
Subsystem) for providing multimedia services.

[0006] E.164 identifiers have been widely used for
identifying users of telecommunication systems providing
telephony services; and, as mentioned above, many systems

still use E.164 identifiers as the only type of identifier that a user (originating user) can use for requesting a communication service towards another user (destination user). The appearance of new telecommunication services

5   made traditional telephony operators to offer some of these new services to their users. Among reasons such as: to allow an smooth migration towards a new telecommunication service replacing an equivalent old one (e.g.: a multimedia service in replacement of a traditional voice-only

10 telephony service), and to avoid user's inconvenience of publishing his/her new identifier(s) for the new service(s) subscribed; a given user subscribes a new service with his/her operator, uses to keep his/her old E.164 identifier associated also to this new subscription. So, for example,

15 a given operator owning a 2G system and a 3G system with IMS, allows users subscribed to its 2G system to migrate their subscription to its 3G system while keeping their old E.164 identifiers. This allow these users to receive services from other legacy telecommunication systems, such

20 as for example, calls or SMS (Short Messages) that are originally addressed using E.164 identifiers.

[0007] When routing a service request to its destination user that contains an E.164 as identifier for said user, for some telecommunication systems (or for some parts of

25 said system through which a certain protocol is used for signaling the service) said E.164 identifier can be found as not suitable for routing and/or identification purposes. Also, in a given point of the execution of a service request, it can be desirable to select a service point

30 (e.g.: a given terminal of the destination user) where to finally deliver the service, being said user identified in said terminal with an identifier which is not the same as the one received in the service request.

PRIOR ART SOLUTIONS

[0008] The aforementioned scenario drove to devise
solutions for obtaining the collection of identifiers
related to a given identifier assigned to a user; and, more
5   precisely (given the wide use made of E.164 identifiers),
to obtain the collection of identifiers related to a E.164
identifier.

[0009] For example, IETF's RFC2916 ("*E.164 number and
DNS*", September 2000) (wherein the term DNS stands for
10   "Domain Name System") discloses a DNS-based service to
obtain information related to the various identifiers and
service types related to a given E.164 identifier. The
service provides the plurality of URLs related to a given
E.164 identifier, and can be used, for example, when a
15   service request comprising an E.164 identifier is received
(e.g.: a telephony call, a SMS, a multimedia session,
etc.).

[00010] Hereinafter, the term "ENUM-DNS" will be used
across the present invention to refer to the translation
20   method and translation system (query translation
mechanisms, DNS database structure, specific data
structures for supporting translation of E.164 identifiers
to URLs, etc.) disclosed in RFC2916 and summarized below
(the same term is also utilized in another standard
25   specification that will be further cited across the
detailed description).

[00011] According to RFC2916, a plurality of identifiers
are stored in a data base. Said data base is structured and
accessed (queried) using the well-known DNS technology.
30   For this purpose the received E.164 identifier is arranged
(as described below) to query a DNS-based data base in a

similar manner as other DNS-based queries are done. Since
the domain "e164.arpa" is being populated to provide the
infrastructure in DNS systems for storage of E.164 numbers,
said domain identifier is included in the query.

5   For example, for a received E.164 identifier such as:
        9876543210
the next query is should be made to a DNS:
        0.1.2.3.4.5.6.7.8.9.e164.arpa
wherein the received digits in the E.164 identifier have

10   been inverted to fulfil existing DNS structured analysis
(structured hierarchically from right to left).
As a result a plurality of URLs that are stored in the DNS
in relationship with said E.164 identifier are received as
a result of said query. Each of these URLs can be related

15   to a specific service, although more than one can be
related to the same service. For example, the query can
yield a set of identifiers such as:

        sip:*John.Doe@OperatorA.se*   (a SIP-URL)
        tel:*+98-7-6543210*   (a TEL-URL)
20   fax:*+98-7-6543210*   (a FAX-URL)
        mailto:*John.Doe@OperatorA.se*   (a MAILTO-URL)
        sip:*JohnnyDoe@OperatorB.fr*   (a SIP-URL)

that are stored in DNS as NAPTR RRs (Naming Authority
Pointer DNS Resource Records), and that can be used as
25   valid routable identifiers for further routing the service
request that contained the E.164 identifier.

[00012] Among said identifiers, the querying entity (for
example, a node in the telecommunication service) can
select one of them and further route the service request
30   according to it. For example, the most appropriate URL for
delivering the requested service can be selected according
to the requested capabilities; so for example, if the
service requested is a voice call, then any SIP-URL can be
selected for delivering it into a SIP-enabled terminal of
35   the referenced destination user. Alternatively, the second
URL (*tel:+98-7-6543210*) could be selected if it is desired

to deliver the call, for example, to a plain telephone set
through a legacy telephony system.

The further routing of the service, would depend on the
nature of the selected URL. So, for example, if the
selected URL has a user-name portion and a domain-name
portion, then the service is routed primarily to the domain
specified by the domain-name portion. For example, if the
selected URL is the first one, then the service is routed
towards the network domain of "OperatorA" in Sweden. If,
however, the fifth URL is selected, then the service should
be routed towards the network domain of "OperatorB" in
France.

[00013] However, the above referenced RFC2916 does not
discloses what to do when more than one identifier is
received related to the same service type for a ENUM-DNS
query translation mechanism (for example, when more than
one SIP-URL are received as a response to a query made with
an E.164 identifier), and even having the same "order" and
"preference" fields.

[00014] Avoiding this non desirable situations by means of
defining a single URL per service related to an E.164
identifier could be not feasible. In fact, the identifiers
to be stored within NAPTR RRs in DNS related to E.164
identifiers can be (as for other similar issues dealing
with identifiers of telecommunication users, such as Number
Portability) a national regulatory matter that can differ
from country to country. So, for example, in some
situations the content of said resource records will depend
to a great extent on what the user assigned to the E.164
identifier decides; while in other situations, the final
content shall be determined by the operator that
(originally) owns the subscription said E.164 identifier
belongs to (i.e.: the "home operator" for said identifier).
Then, this would drive to situations in which there can be

more than one URL per service related to a given E.164
identifier stored in ENUM-DNS.

On the other hand, while keeping the global addressing
possibilities of the E.164 identifier largely used by
5   (assigned to) a given user, it should not be desirable to
limit the number of subscriptions said user can have to a
given (new) service (such as a multimedia service based on
SIP) with more than one telecommunications operator.

SUMMARY OF THE INVENTION

10   [00015] The present invention provides a method, an
apparatus and a system for routing a service request in a
telecommunication system when a plurality of routable
identifiers, related to an identifier received in the
service request, are obtained for routing said service.

15   [00016] According one aspect of the present invention, it
is provided a method for routing a service request that
contains a specific identifier associated to the user who
is the destination of said service. The method comprises a
first step in which a plurality of identifiers are stored
20   in relationship with said specific identifier; any of said
plurality of identifiers being suitable for routing further
service requests that can be received for said destination
user and that comprise said specific identifier, wherein,
at least one identifier of said plurality of identifiers
25   has a format that comprises a user-name portion and a
domain-name portion, being said specific identifier
contained within the user-name portion. In a further step,
when a service request comprising said specific identifier
is received, all or a part of said plurality of identifiers
30   related to the received specific identifier are obtained;
then, if one identifier among said plurality of identifiers
has a format as described above, and its user-name portion

contains the received specific identifier, it is selected for further routing the service.

[00017] According to a further aspect of the invention, it is provided an apparatus for routing a service request in a telecommunication system. The apparatus comprises: communication means, arranged for receiving a service request that contains a specific identifier assigned to the user who is the destination of said service; processing means, arranged for obtaining the plurality of identifiers related to the received specific identifier that are suitable for routing a service requests that contains said specific identifier, and are further arranged for selecting an identifier among said plurality of identifiers that has a format that comprises a user-name portion and a domain-name portion, wherein the user-name portion contains the identifier received in the service request; and routing means arranged to further route the received service request according to the selected identifier.

[00018] According to a further aspect of the invention, it is provided a system for routing a service request in a telecommunication system. The system comprises: a data base and a serving node in said telecommunications network which is in charge of receiving a service request towards a destination user, and further routing said service request. The data base stores a plurality of identifiers that are related to a specific identifier associated to a user, and it is arranged for answering a query that comprises the content of said specific identifier with all or part of said plurality of identifiers. The serving node is arranged to send a query to said data base when it receives a service request that contains said specific identifier, said query comprising the content of the identifier received in the service request. When the response to the query is received in the serving node, it is arranged to

select one identifier, among the plurality of identifiers received in the query, that has a format comprising a user-name portion and a domain-name portion if the user-name portion contains the identifier received in the service

5   request.

[00019] In situations in which two or more identifiers are obtained for routing a service request, and specially when these identifiers are related to different service types and/or different network domains; the aspects disclosed in

10 this invention allows to identify a particular network domain that holds an identifier that contains the one received in the service request, and to route the service to it. This permits further decisions for delivering said service, such as, for example, change of service type,

15 selection of the destination terminal, etc., to be taken in the identified network domain.

BRIEF DESCRIPTION OF DRAWINGS

[0010] Fig.1 shows an schematic view of a two serving nodes of a telecommunication system and a signaling flow of

20 a service request and its further routing according to the invention:

DETAILED DESCRIPTION

[00020] The invention shall now be described in detail with reference to Fig.1 according to a preferred

25 embodiment. Said preferred embodiment considers a 3G mobile system that implements the so called IMS (Internet Protocol Multimedia Subsystem) and its standardized protocol for signaling services, as an example of a telecommunication system where the objects, features and advantages of this

30 invention can apply.

3G systems are standardized by the standardization forum
3GPP (3rd. Generation Partnership Project); being the well
known protocol SIP (Session Initiation Protocol) the one
chosen by 3GPP for signaling services within the IMS of a
5   3G system.

As mentioned previously, this kind of telecommunication
systems (3G systems having the subsystem IMS) are able to
provide variety of telecommunication services, such as
voice calls through circuit-switched technology, voice or
10   multimedia sessions through packet-switched technology,
etc.; and handle various kind of identifiers for
identifying users, including E.164 and URLs. So, when
handling service requests, they can face the need of having
to translate a given identifier, such as an E.164 telephone
15   number, to a more suitable identifier, such as a SIP-URL,
for further routing the service to its final destination.

[00021] However, it shall be understood that the scope of
the present invention is not limited to said 3G systems nor
to a specific signaling protocol; and that a skilled person
20   can readily apply it to any telecommunication system that
receives a service request that contains a given identifier
associated to the destination of said service, when said
identifier is, either: not suitable, or not wanted for
further routing the service, and , at least, one of a
25   plurality of routable identifiers related to said given
identifier has to be used for said purpose.

[00022] For the IMS subsystem of a 3G mobile system, the
3GPP forum has defined a set of functional server entities
in charge of various specialized functions. Among them
30   there are the, so called, CSCFs (Call State Control
Functions) which are in charge of serving control for
services. A CSCF is a functional entity that performs a set
of functions, such as: communication functions, to
communicate with other entities; processing functions, for

carrying out various service logic related to a service which is handled on it; and routing functions, for routing communications to other entities.

Depending on implementation aspects (not standardized by 3GPP, nor relevant for the understanding and scope of the present invention), a CSCF can be located within a physical machine (i.e.: a physical telecommunication node), or distributed across a plurality of physical machines that co-operate for performing its functions.

As a summary, it can be assumed that a CSCF is a serving node in a telecommunication system, such as an exchange in a PSTN, or a MSC (Mobile Switching Centre) in a 2G mobile system, in charge of performing control functions for the services it serves (i.e.: receives, routes or processes).

[00023] According to 3GPP terminology for IMS entities, a CSCF is further named as P-CSCF (Proxy-CSCF), I-CSCF (Interrogating-CSCF) or S-CSCF (Serving-CSCF) according to its role while handling a service request. So, a CSCF is named P-CSCF when communicating with an end user terminal, a I-CSCF when it is the first serving node within an operator's network that receives services requests for a destination user who is subscriber of said operator, and S-CSCF when it is in charge of serving control for a service either: originated by a user, or terminating in a user, to whom it has been assigned to serve.

[00024] Reference is now made to Fig.1 to illustrate the features of the present invention in a state-of-the-art 3G telecommunication system having IMS, and arranged to query an ENUM-DNS data base to obtain identifiers related to a given E.164 identifier.

In Fig.1 two CSCFs are shown (S-CSCF, I-CSCF), each one having its own name (cscf.OperatorX.fr, cscf.OperatorA.se), that intends to represent a CSCF in the network domain of a given operator ("OperatorX") in a given country (France)

that acts as Serving-CSCF for the user (or entity)
originating said service, and another one belonging to
another operator ("OperatorA") in another country (Sweden)
that acts as Interrogating-CSCF for the destination of the
5   service. However, both CSCFs depicted in Fig.1 could belong
to the same operator, being the case of distinct operators
more appropriate to highlight the advantages of the
invention.

At this point, it shall be noticed that, according to 3GPP
10   specifications for IMS, the CSCFs are referenced with their
individual names; as it is shown, for example, in 3GPP
specification 24.228 (version V5.0.0, March 2002) that
shows detailed signaling flows for services in IMS. Since
said individual names (URLs) have to be resolved into the
15   corresponding individual addresses suitable for addressing
messages according to the underlying network protocol
(e.g.: an Internet Protocol address, or IP-address), by
using, for instance DNS or similar technique), they usually
shall contain a domain portion identifying the network
20   realm of the 3G system operator they belong to.

Fig.1 also shows an ENUM-DSN data base. It can comprise one
data base, or a set of hierarchically related data bases.
In any case, particular implementation details related to
said database, even if it is based on DNS technology or
25   not, are not relevant for the scope of the present
invention; wherein, the only relevant aspects for its
understanding are: that said data base is in charge of
storing a collection of identifiers related to a given
identifier; and that said data base is arranged for
30   receiving a query that contains said given identifier, and
to answer the query with one or more among said plurality
of identifiers.

[00025] Step 1 in Fig.1 represents the reception of a
service request in a CSCF (S-CSCF). The service can be, for
35   example, a session (i.e.: call, multimedia session)

requested towards a destination user that can be located within the network domain of the operator where said CSCF belongs to, or located within the network domain of another operator.

5   As cited above, services within the IMS of a 3G system are signalled by using SIP protocol. So, in this example case, a SIP message *INVITE* should be received by the communication means of said CSCF.

The *INVITE* received in step 1 shall contain a valid
10   identifier for the user who is destination of the service. According to SIP protocol, said identifier takes the form of a URL. So, from SIP protocol point of view, there would not be any problem for routing the received service request (INVITE) according to the URL indicated as destination.
15   Said URL could be, for example, a TEL-URL (URL for telephony, as disclosed in RFC2806 *"URLs for Telephone Calls"*, April 2000) or a SIP-URL (URL for SIP, as disclosed in the aforementioned RFC2543 *"Session Initiation Protocol"*). This would then not preclude to further route
20   the received *INVITE* according to the received URL associated to the destination, and without modifying said URL.

In some situations, it might be wanted, however, to change the destination of the *INVITE*. For example, the destination
25   user has registered into a SIP-based system from two terminals and has specified a certain delivery criteria for receiving services. In this case, for example, an specialized SIP-server can provide the appropriate identifiers in order to further route the *INVITE* to any (or
30   both) of these two terminals.

[00026] However, as specified for example in 3GPP specification 23.228 (version V5.3.0, January 2002) (as well as in older versions of the same specification), non SIP-URLs (such as a TEL-URLs) shall not be used for routing

services within the IMS of a 3G system, and would have to
be converted into routable SIP-URLs using ENUM-DNS.

So, for example, if the URL for the destination received in
the *INVITE* of step 3 is a TEL-URL such as:

5   *tel:+98-7-6543210*

it would have to be translated, by using ENUM-DNS or any
other suitable mechanism into a routable SIP-URL.

For this purpose, a state-of-the-art serving node of a
telecommunication system, such as the CSCF (S-CSCF) of the
10   example case, would query in step 2 to an ENUM-DNS data
base. The query would (as mentioned earlier in connection
with the prior-art) comprise the received E.164 identifier
arranged properly to query to a DNS-based data base.
According to this, the query sent in step 3 would contain:

15   *0.1.2.3.4.5.6.7.8.9.e164.arpa*

[00027] The queried data base can have a plurality of
identifiers related to the identifier "9876543210";
however, for the purpose of ENUM-DNS lookup, the only
relevant to this kind of query (E.164 to URL) are the
20   identifiers having URL format. Therefore, the ENUM-DSN data
base would answer back with those URLs that are related in
said data base to the E.164 identifier used in the query.
Using the example case depicted in Fig.1, in step 3 the
CSCF (S-CSCF) would receive the next URLs:

25   *sip:JohnnyDoe@OperatorB.fr*
                      mailto:John.Doe@OperatorA.se
                      sip: 9876543210@OperatorA.se
                      tel:+98-7-6543210

[00028] In this example case, since multiple URLs are
30   received, processing means in the CSCF (S-CSCF), unless
forking method for multiple service delivery are
implemented (which is costly and, sometimes, not
effective), would have to select in step 4 one these URLs
and route the service according to it. If the TEL-URL

(*tel:+98-7-6543210*) is selected, a telephony call should
then be established by towards the E.164 identifier
contained in said TEL-URL. If said E.164 identifier does
not belongs to *OperatorX's* domain, then it can be, for

5   example, routed to the PSTN through the signaling and media
gateways that link the telecommunication system of
OperatorX with a PSTN operator that would end up in the
network domain of the operator that handles a telephony
subscription addressed by said .164 identifier.

10 Also, there could be the particular case in which all the
received identifiers would belong to the same operator as
the CSCF that received the *INVITE* (*OperatorX*). In this
case, the CSCF (S-CSCF) can query with any of the
identifiers to the home server entity (known as HSS or HLR)

15 of said *OperatorX* that would, in turn, provide the address
of the CSCF serving the corresponding user addressed by
said identifiers. The service would be further routed with
any of the received SIP-URLs to said CSCF that, in turn,
could apply a further routing criteria according to, for

20 instance, user preferences or user profile. So, in this
latest case, it would be the CSCF serving to said user the
one deciding where to route the service.

[00029] However, if the identifiers received in step 3
does not belong to the operator said CSCF (S-CSCF) belongs

25 to (*OperatorX*), user preference data and/or user profile
data of a destination user that belong to another operator
(e.g.: *OperatorA* or *OperatorB*), and that would allow this
CSCF (S-CSCF) to make a selection with a certain basis, are
far away to be known (or accessed) by this CSCF of

30 *OperatorX*. In fact, even the identifiers received in step 3
would belong to the same operator said CSCF (S-CSCF)
belongs to, IMS standardized procedures preclude in this
situation to a CSCF acting as a originating S-CSCF to query
to the HSS for this purpose; and also, as mentioned before,

IMS standardized procedures preclude the further routing of the service with other identifier than a SIP-URL.

[00030] Moreover, even in case that one or more SIP-URLs are received from the data base that pertains to the domain of *OperatorX*, if there is at least one SIP-URL among the ones received from the data base that pertains to another operator, it can be doubtful to take the decision of discarding that SIP-URL for further routing the service. For instance, two URL are received as a response to the query sent to the data base; one URL belongs to *OperatorX*, while the other to *OperatorA*. If the destination subscriber, to whom the E.164 is assigned, had originally, and still has, a basic (legacy) telephony subscription with *OperatorA* associated to said E.164 identifier (e.g: the number series of said E.164 identifier originally belonged to *OperatorA*); and has now also a multimedia subscription with said *OperatorA*; then to route the service towards *OperatorA* can probably be the most appropriate decision; mainly if the E.164 identifier can be subject to *Number Portability* and queries for portability are made in the *Number Range Holder Network*. So, once the service would get *OperatorA*'s domain, user preferences and user profile related to the subscription of the destination user in said domain shall be further checked to determine the final routing and delivery criteria for the service. However, these (possible) facts can also be far away to be known (or accessed) by this CSCF (S-CSCF).

[00031] To overcome the problems above, as a part of the administrative process of populate data through DNS system (such as done for populating data related to *Number Portability*), an operator that has, for example, a situation similar as the one described above for *OperatorA*, in which, it holds a basic (legacy) telephony subscription addressed with a legacy identifier (such as an E.164

identifier) not suitable or not desirable for routing
according to a new service type, and a new subscription for
a new service type (such as multimedia services via SIP),
or the same subscription encompassing both services; should
5   populate a URL to be stored in DNS-ENUM that allows
identify uniquely said operator's domain as the one
primarily holding said legacy identifier (e.g.: an E.164
identifier).

[00032] In cases where the new service type uses URL
10   identifiers, this can be accomplished by defining an URL
having, in the user-name portion the content of the legacy
identifier, while in the domain-name portion contains the
appropriate domain identifier, so as to form a routable
FQDN (Full Qualified Domain Name). Said URL, once stored,
15   for example, in ENUM-DNS, together with the rest of
identifiers related to the legacy identifier, would allow
to distinguish it from the others and further route the
service according to it.
In the particular case of E.164 to URL translation; and,
20   more precisely in case of E.164 to SIP-URL translation, the
format of the URL to be populated shall contain the E.164
identifier in a distinguishable format. For example, for an
E.164 such as *9876543210* which is "owned" by operator
OperatorA in Sweden, the SIP-URL could have a format such
25   as:
sip:9876543210@OperatorA.se.
Optionally, the user-name portion could contain additional
information for various purposes, such as reinforcing the
use of this URL, indicate identifier subject to Number
30   Portability, etc. For the same case used as example, a
readily distinguishable formats could also be:

sip:9876543210.E164@OperatorA.se,
sip:non_ported_indication.9876543210@OperatorA.se,
sip:ported_indication.9876543210.ported_identifier@OperatorC.it.

[00033] According to the invention, processing means in the CSCF (S-CSCF) selects in step 4 a distinguishable URL as described above that contains the E.164 identifier used in the query of step 2, and further route the service
5 according to said URL. This process, can imply a further query (not shown in Fig.1) to a translation service (such as DNS) to obtain name and/or network address of the corresponding CSCF where to send the *INVITE* in step 5. Additionally, if an indication of "non_ported" identifier
10 was also received in the selected URL, a further query that could have been requested otherwise by this CSCF (S-CSCF) or by other serving node to obtain number portability information, can be avoided by considering said indication. Similarly, if an indication of " ported" identifier was
15 also received in the selected URL, a further query that could have been requested otherwise by this CSCF (S-CSCF) or by other serving node to obtain number portability information, can be avoided by considering said indication together with the (new) ported identifier received that in
20 this case, preferably, can contain the domain name of the (final) destination network handling the ported identifier.

[00034] Upon reception in step 5 of the *INVITE* in the CSCF that first receives services requests for a destination user (I-CSCF), I-CSCF of *OperatorA* in the example depicted
25 in Fig.1, further state-of-the-art steps can take place. This implies, for example, query to the home server entity, HSS, of *OperatorA* that will provide the address of an CSCF, acting as S-CSCF, that is in charge of serving to the user who has assigned the identifier received in the *INVITE*
30 (i.e.: the destination user). This CSCF can apply a further routing criteria which, for said destination user, are available to this CSCF in this destination domain of *OperatorA*. Said routing criteria can be based, for example, on user preferences, user profile, user location, etc.; and
35 can involve, for example, a subsequent change of the

received identifier and/or service type (e.g.: from SIP session to circuit-switched telephony call), as it would happen if, for instance, the destination user has programmed a call forwarding towards another destination.

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